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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/652,968	08/31/00	AGARWAL	V 98-0616.12

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MMC1/1214

EXAMINER

DIAZ, J

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 12/14/00

**Please find below and/or attached an Office communication concerning this application r proceeding.**

**Commissioner of Patents and Trademarks**

<b>Office Action Summary</b>	Application No. 09/652,968	Applicant(s) AGARWAL, VISHNU K.	
	Examiner José R. Díaz	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 43 and 44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 43 and 44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

#### Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

- The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

- Claims 43-44 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 43 discloses a combination of gases that is not supported by the Specification. Applicant teaches three alternative embodiments wherein a heat treatment is performed using  $N_2/H_2$ ,  $N_2$  or  $NH_3$  (See page 7, lines 7-19). Applicant fails to teach process parameters of a heat treatment wherein  $N_2/H_2$ ,  $N_2$ , and  $NH_3$  are mixed to reduce the amount of oxygen from the semiconductor device. Regarding claim 44, the claim 44 is rejected to as being dependent upon a rejected base claim.

### ***Claim Rejections - 35 USC § 103***

- The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

➤ Claims 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suehiro et al. (US Patent No. 5,719,410) in view of Yamazaki et al. 5,970,384.

Regarding claim 43, Suehiro et al. teach layering a first conductive material (3) (Figure 1B); introducing a reducing gas (e.g. nitrogen, argon, or hydrogen) (column 7, lines 45-50); releasing nitrogen from said gas (column 7, lines 61-62); layering a second conductive material (5) over said first conductive material (3) (Figure 1B).

Suehiro et al. do not teach releasing nitrogen from said gas with electromagnetic energy. Yamazaki et al. teach an irradiation step using ultraviolet light wherein nitrogen is introduced into the boundary of a silicon film (Abstract).

Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to have modified Suehiro et al. to include an irradiation step using ultraviolet light as taught by Yamazaki et al. since such modification would result in a semiconductor device wherein the amount of hydrogen and carbon are reduced and nitrogen is introduced into the boundary of a silicon film, as described in Abstract of Yamasaki et al.

### **Conclusion**

➤ The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Suehiro et al. (US Patent No. 6,100,193) disclose method of manufacturing a semiconductor device. Sasaki et al. (US Patent No. 5,861,675) disclose semiconductor device having WNF film. Derderian (US Patent No. 6,107,152) discloses method of forming tungsten nitride comprising layers using  $\text{NF}_3$  as a nitrogen

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source gas. Huang et al. (US Patent No. 5,994,183) disclose method for forming charge storage structure.

### ***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 8:00 - 5:00 Monday through Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD  
December 8, 2000



**EDDIE C. LEE  
PRIMARY EXAMINER**